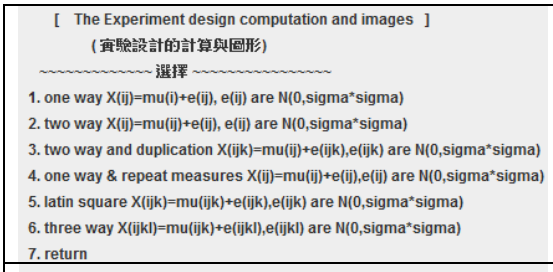
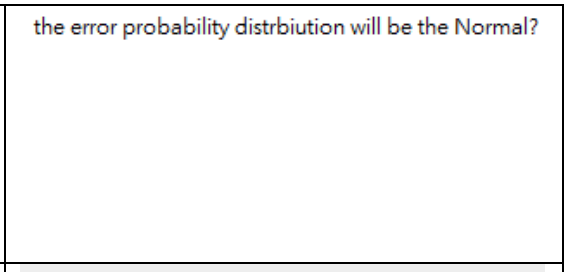
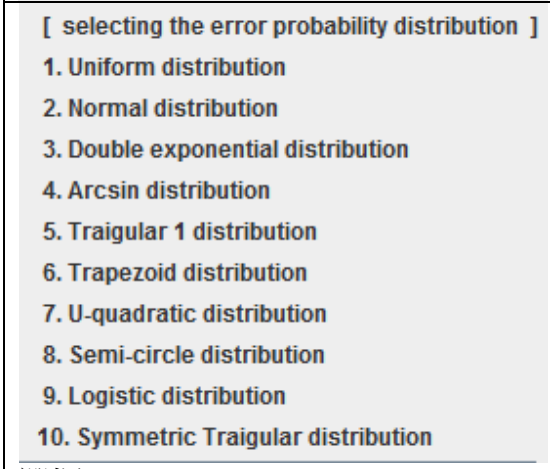
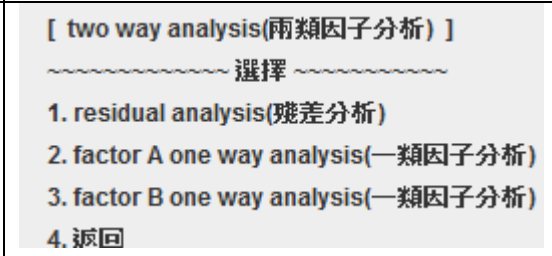
4.實驗設計(變異數分析)

以兩類因子為例









選擇 4,

Output data

以下為由模擬器所得樣本值

X(1,1)=0.000000+e(1,1),e(1,1)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(1,2)=-1.000000+e(1,2),e(1,2)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(1,3)=-2.000000+e(1,3),e(1,3)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(2,1)=1.000000+e(2,1),e(2,1)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(2,2)=0.000000+e(2,2),e(2,2)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(2,3)=-1.000000+e(2,3),e(2,3)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(3,1)=2.000000+e(3,1),e(3,1)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(3,2)=1.000000+e(3,2),e(3,2)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(3,3)=0.000000+e(3,3),e(3,3)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(4,1)=3.000000+e(4,1),e(4,1)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(4,2)=2.000000+e(4,2),e(4,2)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1
X(4,3)=1.000000+e(4,3),e(4,3)~Arcsin(0.000000,2.236068), Variance=10.000000, sample size=1

X(ij)=mu+alpha(i)+beta(j)+e(ij),i=1,..,4, j=1,..,3
mu=0.000000,
alpha(1)=1.000000, alpha(2)=2.000000, alpha(3)=3.000000, alpha(4)=4.000000,
beta(1)=-1.000000, beta(2)=-2.000000, beta(3)=-3.000000,
eij iid Arcsin(0.000000,2.236068), Variance=10.000000

	A1	A2	A3	A4
B1 |	2.2233229589	-1.0938710911	1.4615839230	1.2017208546
B2 |	0.2048710260	-2.0539805894	3.1902168351	-0.0540853850
B3 |	-2.3013805872	-0.0749204586	-1.4464543119	-1.0610581968

There are two factors :A and B

Two way model

X(ij)=mu+alpha(i)+beta(j)+e(ij), i=1,2...,4, j=1,2...,3

	A1	A2	A3	A4
factor A sample mean	0.04227	-1.07426	1.06845	0.02886
alpha estimate value	0.02594	-1.09059	1.05212	0.01253

	B1	B2	B3
factor B sample mean	0.94819	0.32176	-1.22095
beta estimate value	0.93186	0.30543	-1.23728

Total sample size=12 , grand mean=0.016330

summation of alpha(i)=0.000000
summation of beta(j)=0.000000

ANOVA

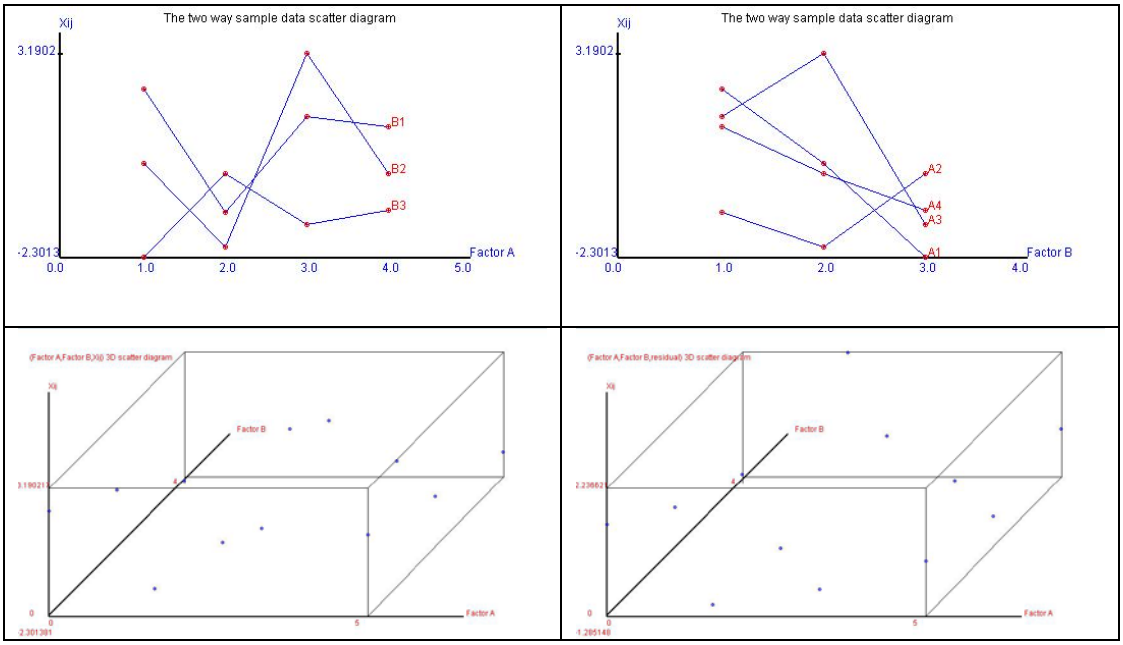
Source	df	SS	MS	F
Factor A	3	6.8914942648	2.2971647549	0.8714267757
Factor B	2	9.9700655966	4.9850327983	1.8910663890
Error	6	15.8165768079	2.6360961347	
Total	11	32.6781366694		

~~~~~ The run test of residual~~~~~~~~~~~~~~~

number of the negative of residual=7
number of the positive ofresidual=5
Run=7
H0: residualis random , H1: Increasing line or decreasing line
Z=0.104103, p-value=0.541500
H0: residual is random , H1: Oscillation
Z=0.104103, p-value=0.458500
H0: residual is random , H1: Increasing line or decreasing line or Oscillation
Z=0.104103, p-value=0.917000

~~~~~~~~~~~~ error ~~~~~~~~~~~~

1.24919	-0.95147	-0.53872	0.24100
-0.14283	-1.28515	1.81634	-0.38837
-1.10637	2.23662	-1.27762	0.14737



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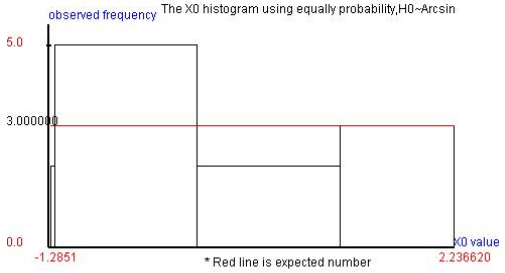
[ two way analysis(兩類因子分析) ]
~~~~~~~~~~~~~~ 選擇 ~~~~~~~~~~~~
1. residual analysis(殘差分析)
2. factor A one way analysis(一類因子分析)
3. factor B one way analysis(一類因子分析)
4. 返回
```

選擇 1，

pearson goodness of fit

class	[1]	[2]	[3]	[4]
lower limit	-1.28515	-1.24513	-0.00000	1.24513
upper limit	-1.24513	-0.00000	1.24513	2.23662
observed no	2.00000	5.00000	2.00000	3.00000
probability	0.25000	0.25000	0.25000	0.25000
expected no	3.00000	3.00000	3.00000	3.00000
chi square	0.33333	1.33333	0.33333	0.00000

degree of freedom=1
H0: X0~Arcsin(mu,c), mu,c are unknown
mu point estimated value=-0.000000
c point estimated value=1.760884 (MLE)
pearson chi-square test statistic =2.000000
p-value=0.157200



選擇 2，

---------- one way ----------

A1	A2	A3	A4
2.2233229589	-1.0938710911	1.4615839230	1.2017208546
0.2048710260	-2.0539805894	3.1902168351	-0.0540853850
-2.3013805872	-0.0749204586	-1.4464543119	-1.0610581968

Only a factor : A
One way model
X(ij)=mu+alpha(i)+e(ij), i=1,2...,4, j=1,2...,n(i)

1=A1, 2=A2, 3=A3, 4=A4

	A1	A2	A3	A4	Total
sample size	3	3	3	3	12
sample mean	0.04227	-1.07426	1.06845	0.02886	0.01633
sample variance	5.13806	0.97946	5.49060	1.28520	
alpha estimate value	0.02594	-1.09059	1.05212	0.01253	

summation of alpha(i)=0.000000

H0:alpha(1)=...=alpha(4)=0
ANOVA

Source	df	SS	MS	F
Treatment	3	6.8914942648	2.2971647549	0.7126681229
Error	8	25.7866424046	3.2233303006	
Total	11	32.6781366694		

~~~~~ The run test of residual~~~~~~~~~~~~~~~
number of the negative of residual=6
number of the positive ofresidual=6
Run=6
H0: residualis random , H1: Increasing line or decreasing line
Z=-0.605530, p-value=0.272500
H0: residual is random , H1: Oscillation
Z=-0.605530, p-value=0.727500
H0: residual is random , H1: Increasing line or decreasing line or Oscillation
Z=-0.605530, p-value=0.545000

~~~~~~~~~~~~ error ~~~~~~~~~~~~

A1	A2	A3	A4
2.18105	-0.01961	0.39314	1.17286
0.16260	-0.97972	2.12177	-0.08294
-2.34365	0.99934	-2.51490	-1.08992